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File: USPT

Apr 30, 2002

DOCUMENT-IDENTIFIER: US 6381644 B2

TITLE: Integrated proxy interface for web based telecommunications network management

Abstract Text (1):

A web/Internet-based Outbound Network Management tool that enables customers of telecommunications network providers to modify outbound access to their virtual networks via a Web/Internet-based graphical user interface. Via a secure Web/Internet-based connection, the tool enables customers to add, create, modify or view their outbound network telecommunications network assets including: calling party numbers, calling cards, virtual network dialing plans, and their Code ID/Set attributes and features associated with their virtual networks.

Brief Summary Text (6):

The assignee of the present invention, MCI, currently provides an MCI ServiceView ("MSV") product line referred to as Virtual Network "Vnet" which is a telecommunications service offering private network capabilities and features at low cost to multi-location companies with domestic and international calling needs. Particularly, the Vnet virtual network uses switched public network facilities, sophisticated software systems, and MCI's virtual network to provide customers with a private voice and data network. MCI's Vnet service additionally provides consolidated long distance service for all locations, eliminating the need to provide multiple long distance services to locations of different sizes. Thus, Vnet is suitable for long distance calls between company locations, as well as long distance calls to U.S. and international locations. This allows for a consolidation of all company long distance usage charges for all locations under one corporate invoice and one basic rate structure subject to a volume discount.

Brief Summary Text (7):

Another MCI MSV product is referred to as "Vision" which is an integrated product for consolidated or multi-location business. The "Vision" network platform is similar to that of "Vnet," and is also a software defined virtual network telecommunications service offering a single solution for: domestic and international outbound calling, inbound Toll-Free service, card, data and the different access types which include: outbound, Toll-free inbound, switched data, dedicated and IntraLATA. Vision also offers Customized Business Programs with special rates and discounts geared to meet customer's specific traffic pattern needs.

Brief Summary Text (10):

With more particularity, the MSV Outbound NM Call Tracking and Control feature enables a customer to establish the rules that apply to calls made on their Vnet/Vision network including: 1) establishment of Range Privileges for allowing restriction of calls to specific geographic areas; 2) establishment of Range Restrictions for restricting the use of a calling card from a specific origination point to specified termination point(s); 3) establishment of rules for extending a customer's Vnet/Vision network beyond a corporate boundary; 4) establishment of Supplemental Codes which may be used for controlling and monitoring a business including ID codes that specify who may place calls and their range privileges, and accounting codes that associate a call with a category that a customer may specify for their internal audit/call management purposes; and 5) establishment of exclusions which enable the blocking of calls to specific numbers and/or geographic locations, e.g., prohibiting calls to a single number or range of specified public numbers.

Brief Summary Text (13):

Using the MSV MCI Outbound NM involves creating and approving orders that change the configuration of a customer's network. MCI Outbound NM assigns each order a unique number (e.g., in the format VXXXXXX) and presents a series of screens for user input and approval.

Once the order is approved and becomes complete in the system, it becomes a record in the customer's inventory, and the change is active within the customer's network. An inventory is a complete listing of the current configuration of a customer's Vnet/Vision Network, including Calling Party Numbers (CPNs), Calling Cards, Dedicated Access Lines (DALs), Remote Access Number(s) and all active records (complete orders) in the network database.

Brief Summary Text (15):

Specifically, there are two types of access levels to MCI MSV Outbound NM: 1) System Administrator; and, 2) User. For example, a special User ID may be established for each System Administrator of the customer's corporation which ~~would enable the system administrator to perform the following: 1) view a list of users or workstations; 2) add a user; 3) add an MCI ServiceView application to a user; 4) Modify user information; 5) reset a user's password; 6) delete a user and/or application.~~ The System Administrator may further assign or restrict certain MCI Outbound NM features for each user which can range from the types of orders a user can access, to various levels of order administration privileges, such as approving or unapproving an order. For example, MCI Outbound NM user privileges that may be established include: permitting or restricting a user's access to 1) calling party number (CPN) orders; 2) Calling Card Orders; 3) dialing plan orders; and 4) ID code set orders. Further privileges may include: 5) authority to approve orders. For example, if user's access is restricted, the user may create orders, but they will remain in a "Not Approved" status when the orders are closed. A user with order approval authority must open the orders and approve them to release them for processing; 6) authority to specify an order priority, e.g., immediate approval would correspond to order priority 1; 7) authority to modify orders. For example, if permitted, the user can modify/delete orders that are in "Not Approved" status; 8) authority to unapprove orders. For example, if permitted, the user can unapprove an "approved" order that has not yet completed, in order to modify or delete the order; and, 9) ability to modify the date/time required for an approved order. Further order administrative functions enabled by MSV Outbound NM include: ability too review orders without changing them; and, the ability to see the status of an order.

Brief Summary Text (19):

The present invention is directed to a novel Outbound network management tool for a Web-based (Internet and Intranet) client-server application that enables customers to define their own Virtual Network (Vnet) routing plans via the Web/Internet. The Outbound network management tool enables customers to order and link network attributes and features to their outbound network calling party numbers, calling cards, and Vnet/Vision dialing plans, and to assign ID Code/Set (s) to outbound network subscribers.

Brief Summary Text (20):

The Outbound network management tool client server application is a Web-based, object-oriented application that implements a Remote Method Invocation "RMI"-like protocol providing customers with the ability to request, specify, receive and view data pertaining to their Vnet network management assets, e.g., Vnet number routing plans, calling card inventories, etc., and to generate orders for changing aspects of the Vnet routing plans via a World Wide Web interface.

Detailed Description Text (38):

In the preferred embodiment, all DMZ Secure Web servers 24 are preferably DEC 4100 systems having Unix or NT-based operating systems for running services such as HTTPS, FTP, and Telnet over TCP/IP. The web servers may be interconnected by a fast Ethernet LAN running at 100 Mbit/sec or greater, preferably with the deployment of switches within the Ethernet LANs for improved bandwidth utilization. One such switching unit included as part of the network architecture is a HydraWEB.TM. unit 45, manufactured by HydraWEB Technologies, Inc., which provides the DMZ with a virtual IP address so that subscriber HTTPS requests received over the Internet will always be received. The Hydroweb unit 45 implements a load balancing algorithm enabling intelligent packet routing and providing optimal reliability and performance by guaranteeing accessibility to the "most available" server. It particularly monitors all aspects of web server health from CPU usage, to memory utilization, to available swap space so that Internet/Intranet networks can increase their hit rate and reduce Web server management costs. In this manner, resource utilization is maximized and bandwidth (throughput) is improved. It should be understood that a redundant Hydroweb unit may be implemented in a Hot/Standby configuration with heartbeat messaging between the two units (not shown). Moreover, the networkMCI Interact system architecture affords web server scaling, both in vertical and horizontal directions. Additionally, the architecture is such that new secure web servers 24

may be easily added as customer requirements and usage increases. The use of the HydraWEB.TM. enables better load distribution when needed to match performance requirements.

Detailed Description Text (45):

A common database may be maintained to hold the common configuration data which can be used by the GUI applications and by the mid-range servers. Such common data will include but not be limited to: customer security profiles, billing hierarchies for each customer, general reference data (states, NPA's, Country codes), and customer specific pick lists: e.g., ANI's, calling cards, etc. An MCI Internet StarOE server will manage the data base for the common configuration of data.

Detailed Description Text (52):

The present invention focuses on the client, middle-tier and proxy service that enable customers to request, specify, and receive and view data pertaining to their Vnet network management assets, e.g., Vnet number routing plans, calling card inventories, etc., and to generate orders for changing aspects of the Vnet routing plans via a World Wide Web interface.

Detailed Description Text (56):

An exemplary ONM web-page display 294 is shown in FIG. 9(a) which presents a variety of ONM menu options including: 1) a File menu option 402 providing a selection 404 for creating a new order, a selection 406 for opening an existing order, a selection 408 for displaying events, and a selection 410 for enabling 3270 cut through to a Vnet/Vision configuration management system; 2) an Edit menu 415 providing options for deleting an ONM order or, enabling a search for specific components, e.g., within an Order detail and Inventory windows pertaining to a Calling Party Number ("CPN"), Calling Card, Dialing Plan, and ID Code/Set, such as will be described; 3) a Control menu 420 providing a refresh option to enable a user to retrieve a list of all updated lists that have been altered on the host system including: Network IDs, Range Privileges, ID Code Set, Billing location ID, Customer Service ID, Location/Access type and Provisioning Carrier; and 4) a Report menu 422 providing options enabling a customer to inquire on his/her inventory of CPNS, Calling Cards, Dialing Plans and ID Code Sets.

Detailed Description Text (57):

With more particularity regarding the File menu option 402, when a user selects the new order menu option 404, he/she is presented with a drop down menu (not shown) presenting a section of the order types which can be created via their Web Browser, e.g., CPN, Calling Card, Dialing Plan, and ID Code Set. When the user selects the open order selection 406 from the drop down menu of FIG. 9(a), the user is presented with a web page 425 displaying a request order window where the user may enter search criteria from which a user may select orders, or, choose all orders. As shown in FIG. 9(b), the user may enter the following search criteria: an exact order number or partial order number in the "order match" field 430; an order type, e.g., Calling Card, CPN, Dialing Plan, ID Code Set, or all, from a drop down list presented by "order type" drop down menu 432; a starting date or current default date in the "starting date" field 435; a user ID or default current user ID from the "user ID" field 439; and, a set of order status check boxes 440 which enables the user to choose an order status, e.g., not approved, approved, complete, and error/rejected.

Detailed Description Text (60):

FIG. 9(d) illustrates a web page 455 comprising a CPN order window comprising the following sections: an order administration section 460 for handling administrative aspects of the CPN order; a CPN inventory section 470 used to retrieve CPNs from inventory that are not included on another order. This is accomplished by selection of the retrieve button 475 and enables display of, inter alia, the CPNs and associated PINs, a description assigned to the CPN, and a component count; a CPN updates section 480 which populates the CPN order window by moving selected calling cards from the cards in inventory section or by adding new calling cards to the current order; and, an attributes section 490 for populating an area of the web page screen display 455 with a list of attributes, or features, for a selected CPN in the inventory or updates section.

Detailed Description Text (68):

As shown in the example web page display of FIG. 9(g), a first section referred to as the CPN information section 540 comprises view only fields presenting information such as: a three digit country code field 541 which identifies the country of origin for this CPN; a "From" field 542 indicating the beginning number of a possible range of CPNs affected by this CPN

Order; a "To" field 543 indicating the last number of a range of numbers affected by this CPN Order; a Customer Account field 544; a Division ID field 545; a Description field 546 describing the CPN(s); and, a yes or no Cellular field 547 indicating whether this CPN originates from a cellular phone. Additionally, a second section referred to as the CPN feature information section 550 comprises the following field/command buttons including: a Network ID field 552 obtained from the drop-down list by selecting the down arrow; a Range Privilege field 553 for selecting the Range Privilege (customized or universal) to be linked to this Calling Card from the drop-down list by selecting the down arrow; an ID Code Set field 554 for selecting an ID Code Set to be associated with this CPN from the drop-down list by selecting the down arrow. When an ID Code Set is chosen, nMCI Interact ONM automatically populates the ID Code Length; a Supp Code Collection field 555 enabling selection from the drop down list to indicate when ID and/or accounting codes will be collected for this CPN. A tone will prompt callers to enter code(s) after the dialed number. Selections include: 0--Do not collect Supplemental Codes; 1--Collect Supplemental Codes for all numbers; 2--Collect Supplemental Codes on all calls except 7-digit Private On-Net Numbers; 3--Collect Supplemental Codes only for international Off-Net numbers; 4--Collect Supplemental Codes for all Off-Net numbers; a Data Indicator field 556 enabling a user to denote data versus voice traffic by selecting from the drop-down list; a Prov Carrier 557 indicating the provisioning carrier (MCI or Stentor) associated with the CPN, in the format of Country Code, padded to three digits with leading zeros, and the 4-digit Carrier Code; a Location Type field 558 which may be selected by clicking on the down arrow to activate the drop down list; an ID Code Length field 559 which is autopopulated with a 2-digit number according to the ID Code Set selected; an Account Code Length field 560; and, <Set Default>, <Use Default>, <OK>and <Cancel>option buttons, as described herein.

Detailed Description Text (69):

When opening an existing Calling card order, the nMCI Interact ONM system Calling Card Order option allows a customer to "link" or attach network features to a Calling Card(s) that exist in that customer's inventory, i.e., Calling Cards that are active in that customer's database, or link network features to a new calling card. The following features can be defined/linked to Calling Cards: 1) Multiple Networks; 2) Range Privileges including Universal and Customized; Range Restrictions including Corporate and Custom; and Extended Enterprise (Location/Access Type).

Detailed Description Text (70):

FIG. 9(h) illustrates an example web page 570 comprising a Calling Card order window comprising the following sections: 1) an order administration section 580 for providing administrative aspects of the Calling Card order such as: enabling entry of a date/time when the order is to be implemented by the host; selecting a priority based on the user's security access privilege; establishing an order status, e.g., approved or not approved for new orders in accordance with a users authorization; 2) a Cards in Inventory Section 590 used to retrieve Calling Cards from inventory that are not included on another order. This is accomplished by selection of the retrieve button 595 and enables display of, ~~inter alia, the Calling card numbers and associated PINs, a description assigned to the calling card, and a component count,~~ 3) ~~a Card updates section 600 which populates the calling card order window by moving selected calling cards from the cards in inventory section or by adding new calling cards to the current order; and,~~ 4) an attributes section 610 for populating an area 612 of the screen display with a list of attributes, or features, for a selected calling card in the inventory or updates section.

Detailed Description Text (71):

With more particularity, the Calling Card order administration section 580 of web page display 570 comprises the same field descriptions as mentioned herein with respect to the CPN order administration including: 1) a set date/time field 582 for when the calling card order is to be implemented by the host; 2) a priority field 584 for establishing calling card order priority (depending on security access privileges); 3) a current order status field 586; 4) a Remarks text field 589 optionally used to describe the contents of the Calling card order; and, 5) an Approve field 588 such that when checked, indicates the order is approved and transmitted to the host.

Detailed Description Text (72):

~~The Calling Card inventory section 590 used to retrieve a Calling Card(s) from the Calling Card inventory comprises the following field/command button descriptions: a Card Nbr PIN field 592 that displays the Calling Card number and associated PIN if the user has security access to~~

view the PINS; a Description field 594 which comprises a description assigned to the Calling Card, e.g., the employee or company name; a Component Count field 596 indicating how many Calling Cards are within the Calling Cards Inventory section; a Retrieve button 595 such that, when selected, retrieves a list of a customer's available Calling cards in inventory that are not included in other orders. Selection of this option will enable a web page display of a Retrieve Calling Cards from Inventory Window 620 such as shown in FIG. 9(i); and, a right arrow ">" command button 598 enabling a customer to move single or multiple (selected) Calling Cards from the Calling Cards in inventory section to the Calling card Updates to include on the current order.

Detailed Description Text (73):

The Calling card updates section 600 comprises the same field/command button descriptions as mentioned herein with respect to the CPN order administration including: a status code indication 601 displayed next to a Calling card having the same designations, i.e., no status, "A", "C", and "D"; a Card Nbr-PIN field 602, a Description field 603 and, a Component Count field 604 as described above; a left arrow "<" command button 605 enabling a customer to remove a Calling card from the current order, and to restore its attributes back to those that were last transmitted to the host, i.e., move one or more highlighted Calling cards to the Calling cards in Inventory section; an "Add" command button, e.g., only displayed for Stentor customers; and, a "Delete" command button.

Detailed Description Text (74):

The Calling Card attributes section 610 comprises the same field/command button descriptions as mentioned herein with respect to the CPN order administration including: a table 612, including an "Item" field 611 comprising those Vnet/Vision feature items that are listed in this column once linked to Calling cards, e.g., Range Privilege, Location type, etc.; a "Value" field 613; a "Card Nbr" field 614 which designates the information displayed in the Attributes section is for the selected Calling card, which can be either in the Calling card In Inventory or Calling cards Updates sections; a <Set Dflt>button 615 which enables a customer to define the PC default for Calling card attributes. Once set, the PC default values can be applied to other Calling cards by selecting the <Use Dflt>button 616 which command provides the option of applying either the host default or the user-defined PC default attributes for the selected Calling card; an <Undo>button 617; an <Expand>button 618 enabling the display of the Calling Card Attributes window, such as shown in FIG. 9(j); and a <Close>button 619 for closing the Calling card Order window.

Detailed Description Text (75):

As mentioned above, selection of the Calling card "Retrieve" button 595 in FIG. 9(h) enables a ~~web page display of a Retrieve Calling cards from Inventory Window 620 such as shown in the~~ example web page of FIG. 9(i). From this web page, a customer may specify search criteria or retrieve a predetermined amount of Calling cards having defaulted criteria. Particularly, the Retrieve Calling cards from Inventory Window 620 comprises the following field/command button descriptions for retrieving Calling cards from customer inventory: a Card Nbr field 621 enabling entry of a partial or whole 10-digit calling card number; a PIN field 622 enabling entry of an optional 4-digit personal identification number that is associated with the Calling Card number and can only be used in combination with Card Nbr; a Quantity field 623 enabling a customer to enter a value, from 1 to 200 per Calling card group, specifying the quantity of Calling cards to include in the retrieval; a Network ID field 624; a Range Privilege field 625 enabling a customer to select a specific Range Privilege from the drop-down list by selecting the down arrow; a Description field 626 enabling a customer to type a full or partial Calling card description as retrieval criteria; an <Add>button 627 for updating the list box with the group information from the Card Nbr, PIN, Quantity Network ID, Range Privilege, and Description edit boxes; a <Remove>button 628 enabling a customer to remove a highlighted display item so that it is not included in the retrieval request; an <OK>button 629 for accepting all entries in the Retrieve Calling cards from Inventory window, and messaging the host; and, a <Cancel>button 630 for closing the Retrieve Calling cards from Inventory window without accepting any changes.

Detailed Description Text (76):

As mentioned above, selection of the Calling card <Expand>button 618 (FIG. 9(h)) from the calling card attributes section enables a web page display of a Calling card Attributes window 640, such as shown in FIG. 9(j). From this window, a customer may "view only" calling card attributes or features, if the selected calling card is located in the Cards in Inventory

section of the calling card order window, or, view or modify attributes if the selected calling card is in the Card Updates section. As shown in the web page display of FIG. 9(j), a first section referred to as the calling card information section 635 comprises view only fields presenting information such as: the Calling Card Number 636 and the associated PIN 637; the Customer Account number 638; and the calling card description 639 which is user-defined and accessible. Additionally, a second section referred to as the feature information section 641 comprises the following field/command buttons including: a Network ID field 642 obtained from the drop-down list by selecting the down arrow; a Range Privilege field 643 for selecting the Range Privilege (customized or universal) to be linked to the Calling Card from the drop-down list by selecting the down arrow; a Range Restriction field 644 for selecting a Corporate or Custom Range Restriction to be linked to this Called Card from the drop-down list by selecting the down arrow; a Prov Carrier field 646 which indicates the provisioning carrier (MCI or Stentor) associated with the Calling Card, in the format of Country Code, padded to three digits with leading zeros, and the 4-digit Carrier Code; a Location Type field 648 for example, host default, which, once selected, cannot be changed until the Calling Card is deactivated and reinstalled; a <Set Default>button; an <Use Default>button; an <OK>command button for returning to the Calling Card Order window; and a <Cancel>button for exiting the Calling Card Attributes window without making changes to the feature information.

Detailed Description Text (77):

In a similar manner as described above with respect to the Add New CPN web page display (FIG. 9 (e)), a Stentor customer, if authorized, may add a new Calling Card to their inventory and assign attributes. The Add new Calling Card functionality includes: assigning a card number and associated personal identification number (PIN), adding a provisioning carrier in the format of a country code, and, adding a Calling card description. It should be understood that Calling card orders may be deleted by selecting a delete button.

Detailed Description Text (82):

The Dialing Plans in Inventory section 670 used to retrieve Dialing Plan(s) from the Dialing Plan inventory comprises the following field/command button descriptions: a Ctry field 671 that displays the Dialing Plan's country code; a Dial Plan Beginning field 672 indicating the remaining digits of the Dialing Plan number of beginning number within a range; a type field 673 indicating the termination type for the dialing plan; a Component Count field 674 indicating how many Dialing Plans are within the Calling Cards Inventory section; a Retrieve button 675 such that, when selected, retrieves a list of a customer's available Dialing Plans in inventory that are not included in other orders. Selection of this option will enable a web page display having a Retrieve Dialing Plans from Inventory Window 700 such as shown in FIG. 9 (l); and, a right arrow ">" command button 676 enabling a customer to move single or multiple (selected) Dialing Plans from the Dialing Plans in inventory section to the Dialing Plan Updates to include on the current order.

Detailed Description Text (86):

As mentioned above, selection of the Dialing Plan <Expand>button 698 from the Dialing Plan attributes section enables a web page display of a Dialing Plan Attributes window 720, such as the example web page display shown in FIG. 9(m). From this display, a customer may view Dialing plan attributes or features, if the selected dialing plan is located in the Dialing Plans in Inventory section of the Dialing Plans Order window, or, view or modify attributes if the selected calling card is in the Dialing Plan Updates section.

Detailed Description Text (99):

Furthermore, with respect to the report menu option 422 provided in the main web page display of FIG. 9(a), users are enabled to inquire on their respective inventory for CPNs, Calling Cards, Dialing Plans, and ID Code Sets. The ONM system will display respective "Retrieve" item from inventory, e.g., election of report option for CPNs enables the display of the Retrieve CPNs from inventory screen as shown in FIG. 9(f). Particularly, in the ONM system 200, four inventory reports may be provided to customers: CPN, Calling Card, Dialing Plan, and ID Code Set. Reports may be requested from the screen display of FIG. 9(a), however, will be delivered to the nMCI Interact Inbox message center 31 (FIG. 6), for client viewing and retrieval in the manner as described in co-pending U.S. patent application Ser. No: 09/159,512 entitled MULTI-THREADED WEB BASED USER IN-BOX FOR REPORT MANAGEMENT, the contents and disclosure of which is incorporated by reference as if fully set forth herein.

Detailed Description Text (101):

In the preferred embodiment, as shown in FIG. 6, the ONM server 250 communicates a logon message 251 via Registry messaging to NetCap. Via the ONM Client Application, the user is now able to initiate invocation of the various ONM orders, e.g., CPN, Calling Card, Dialing Plan, and ID Code/Sets orders, depicted in FIG. 6 as HTTPS order request messages 222, 224 pertaining to that customer's Vnet/Vision network(s).

CLAIMS:

4. The interactive Web/Internet based network management system as claimed in claim 2, wherein a customer's outbound telecommunications network asset capable of being modified includes customer's calling card numbers.
15. The method as claimed in claim 13, wherein a customer's outbound telecommunications network asset capable of being modified includes customer's calling card numbers.

[Previous Doc](#)[Next Doc](#)[Go to Doc#](#)